

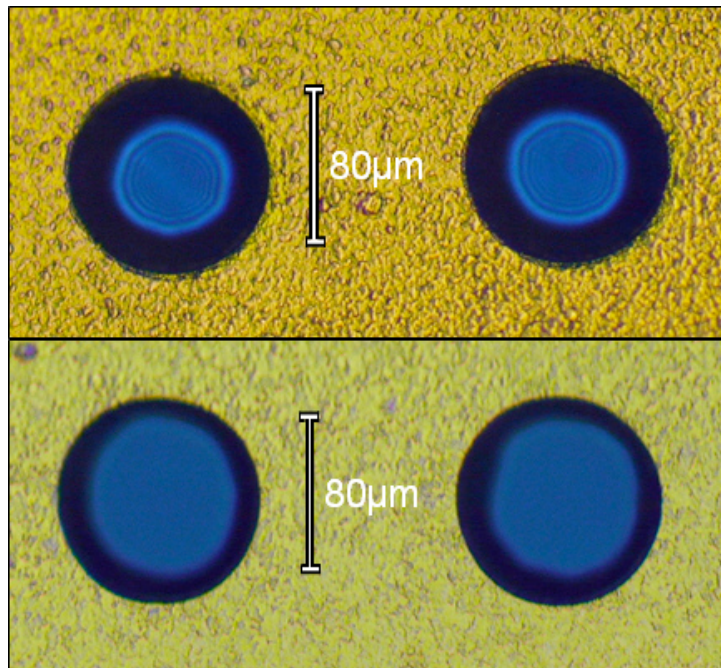
# GEM Batch Comparison

Jason and Zvi

18 December 2007

# Different Inner Holes ...

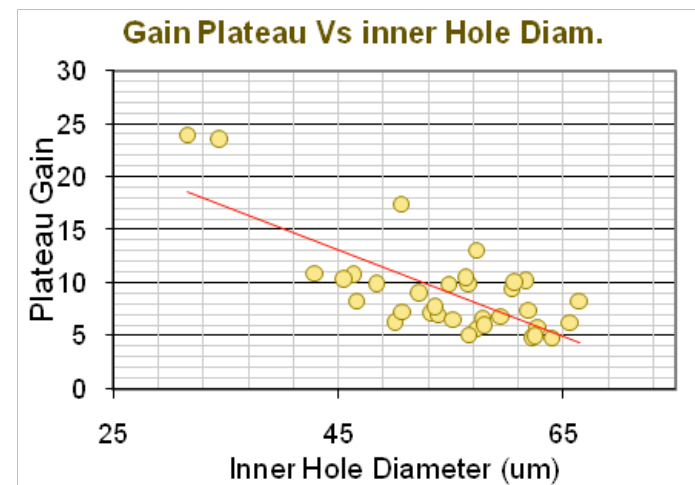
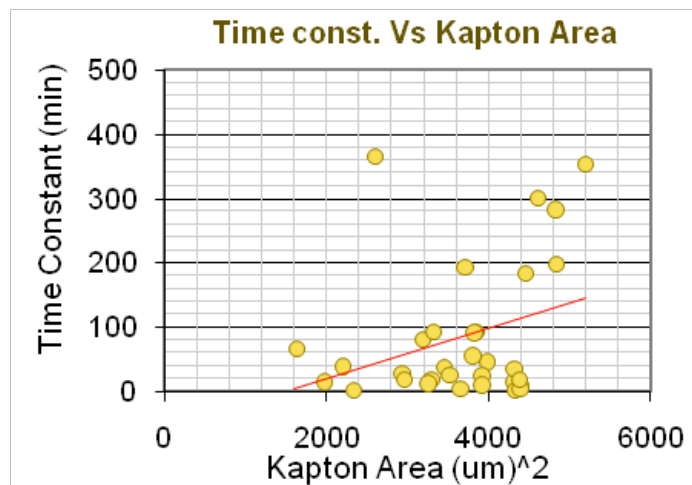
According to Rui the inner hole diameter of  $45\mu \pm 5\mu$  (2006) was changed to  $55\mu \pm 5\mu$  (2007), i.e.  $\sim 1/2$  as much kapton in the new batch, as per Sauli's instructions.



2006

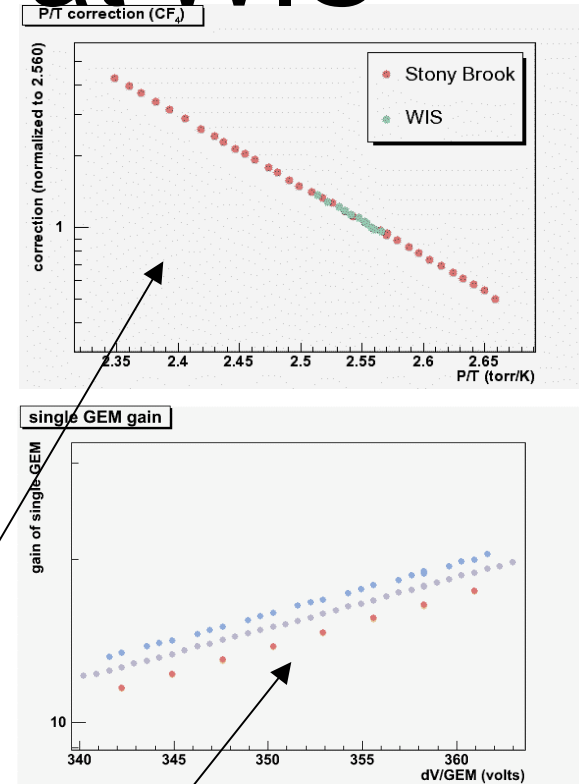
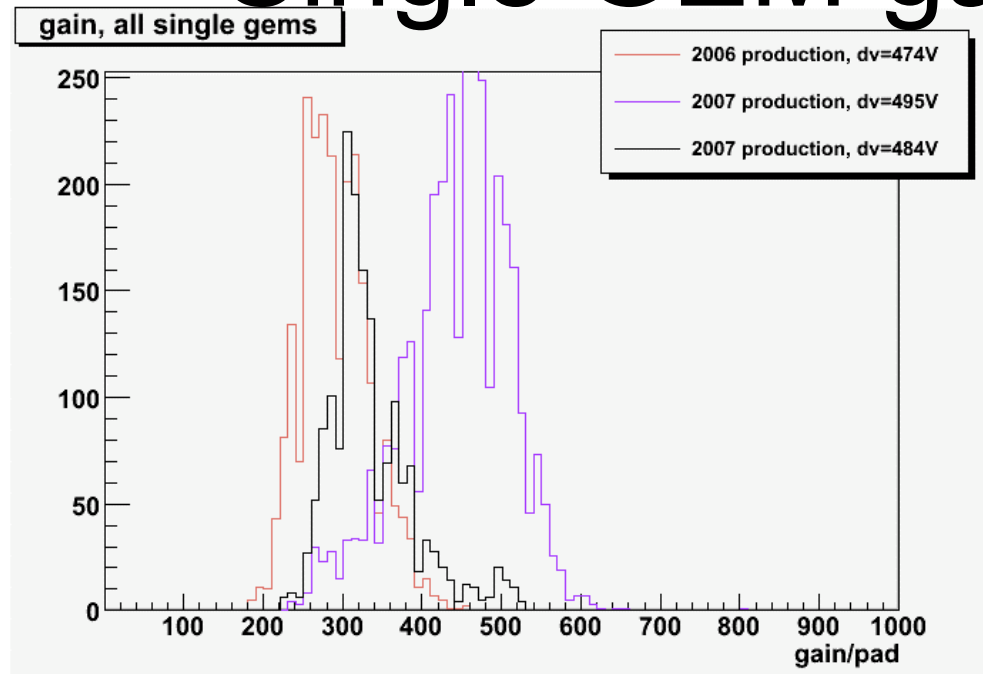
2007

# ... Make For Different Gain Characteristics



- These correlations were seen in TechEtch GEMs at BNL.
- Presented by Bob at IEEE
- We can assess this effect on our gems using the single gem gain measurements made at WIS.

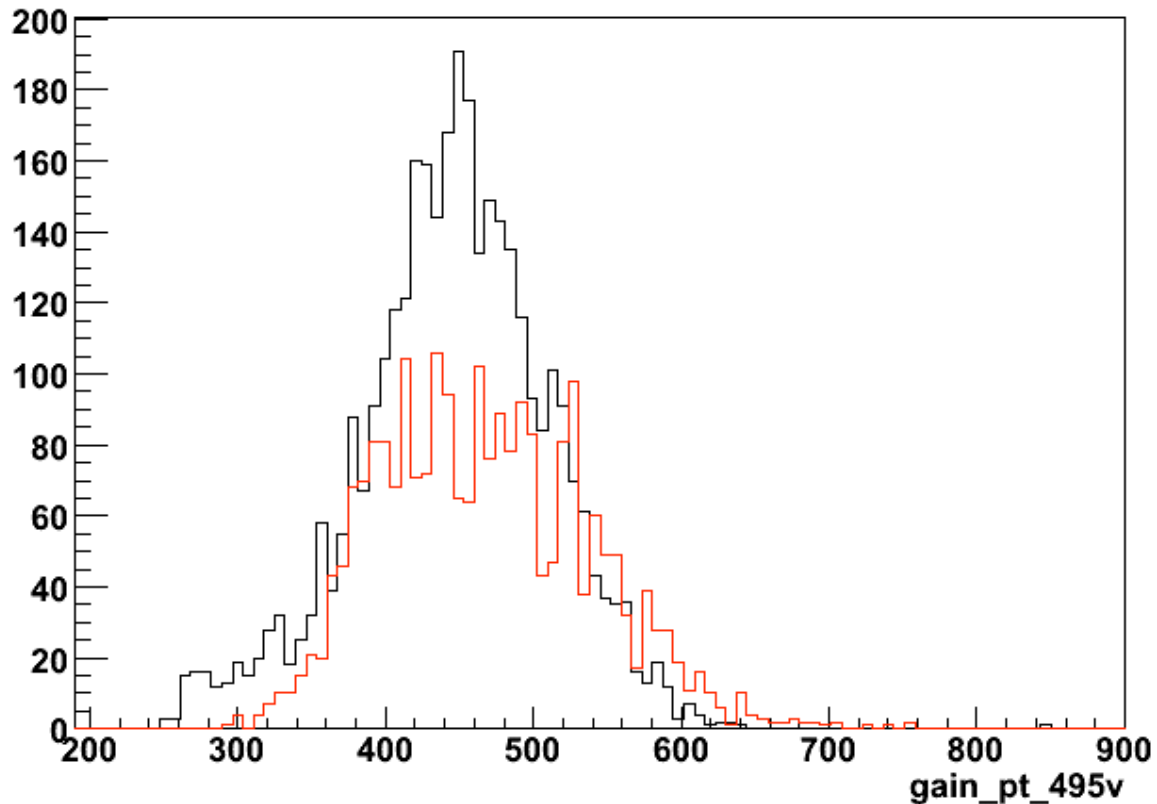
# Single GEM gain at WIS



- This is a bit of a mess.
- How can we compare 2006 to 2007???
- We have a very good handle on:
  - P/T
  - relative voltage
- Let's correct the data!

# Voltage Normalization to $dV=495$

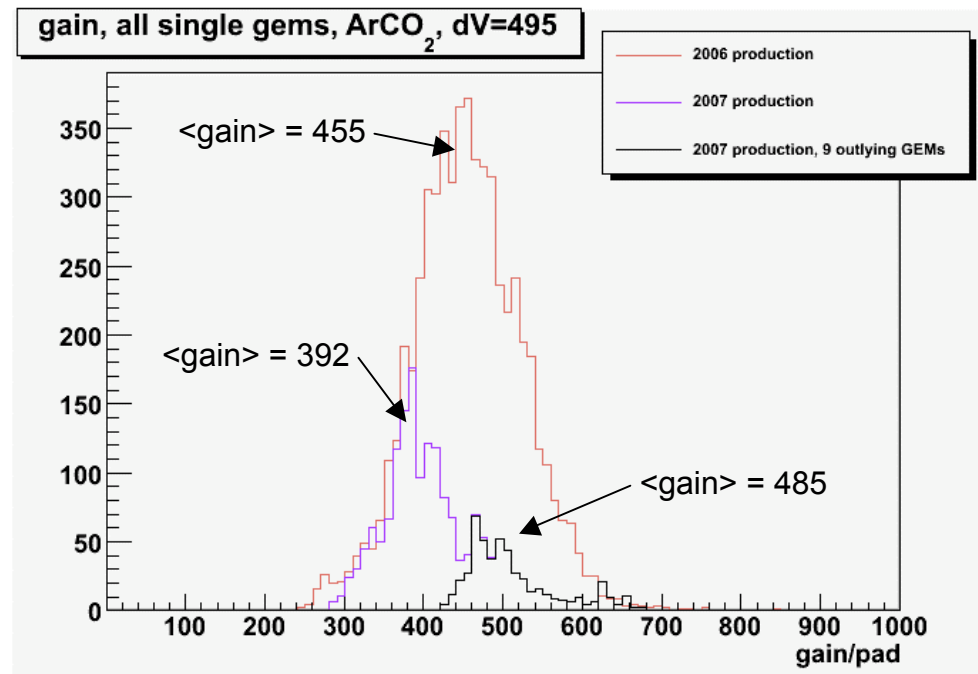
gain\_pt\_495v {gem<200&&dv==495}



dV=495

dV=474

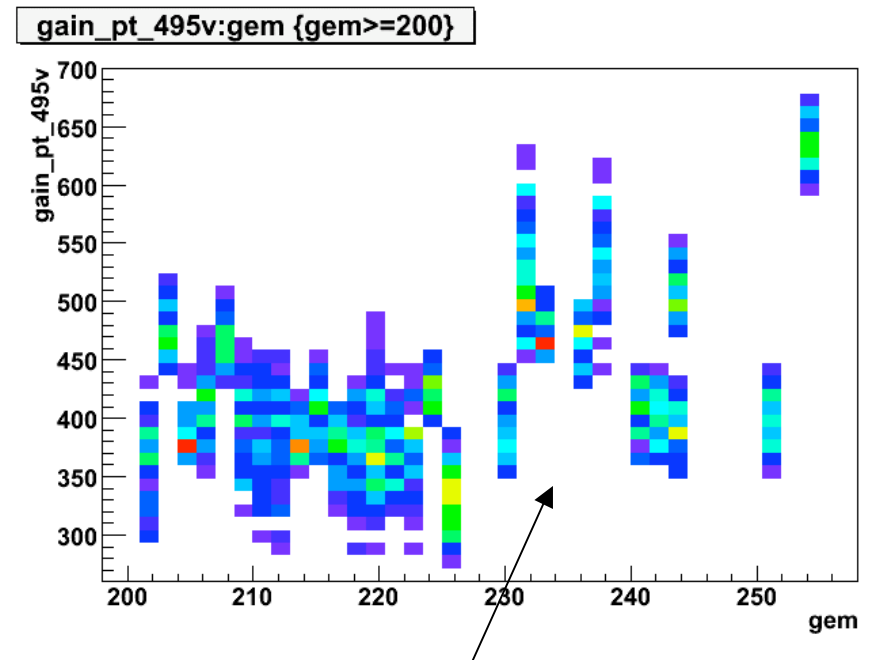
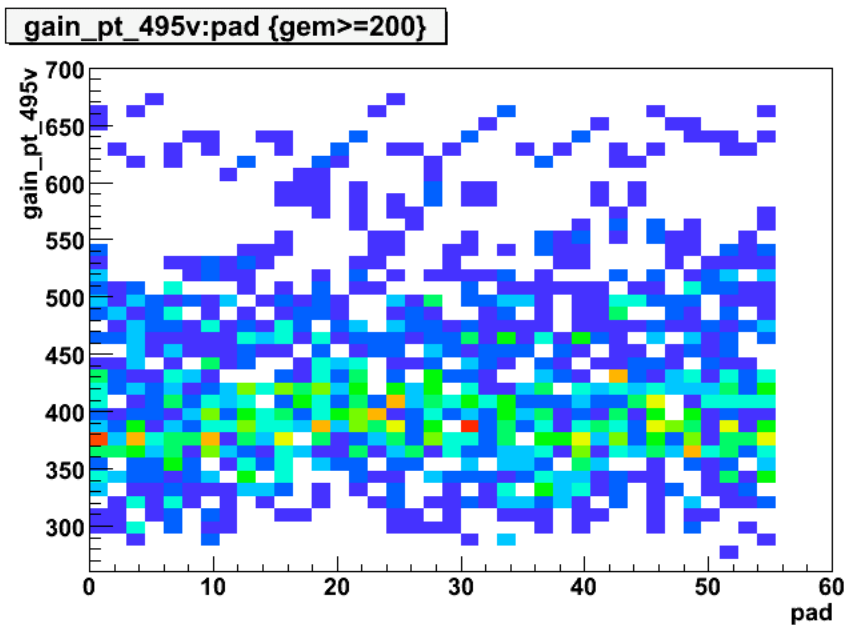
# After Normalizing



- compared to 2006 production GEMs,
  - 22/31 2007 production GEMs have ~15% *lower* gain.
  - 9/31 2007 production GEMs have ~7% *higher* gain.

# Pads or GEMs?

The outlying peak is indeed a GEM and not a pad effect.

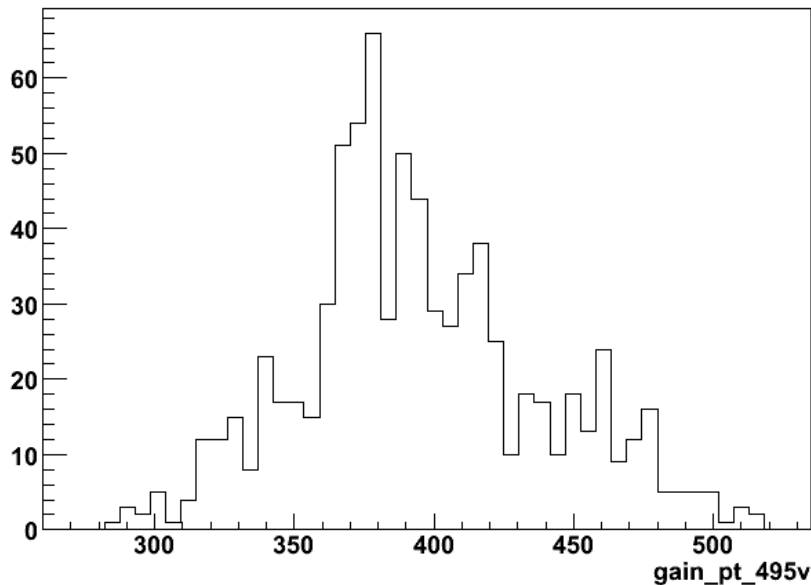


Is that a trend?

# High Gain is Chiefly in WIS

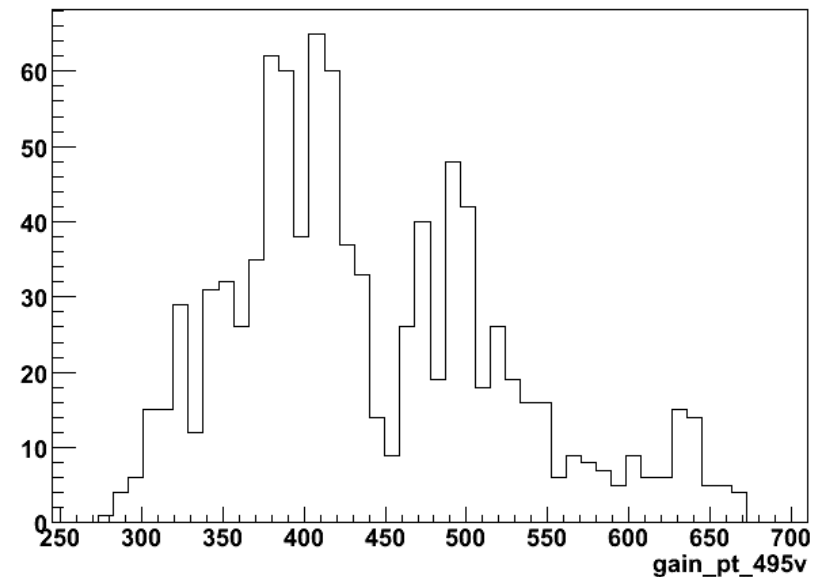
## Batch 9

gain\_pt\_495v {gem>=200&&batch==8}



Batch 8 - single peak

gain\_pt\_495v {gem>=200&&batch==9}



Batch 9 - double peak



# And So ...?

- We will further measure the characteristics of the outlying GEMs compared to the rest. (Large scale optical options available at SB)
- We will have to be deliberate in making detector stacks to maintain gain uniformity.